glands were independently associated with Xer_{6m}, with a correlation coefficient of 0.454 between the model predictions and Xer_{6m}. No multivariable model with multiple significant independent predictors was found for Xer_{12wk}.
A significant correlation between Xer_{6m} and Xer_{12wk} was found with a correlation coefficient of 0.627
Conclusions: The volume and density of the parotid glands and the density of the submandibular glands are associated with xerostomia after radiotherapy. The changes of these CT image features over the course of treatment are more strongly related to xerostomia than the instantaneous feature values at baseline. Moreover, the feature changes in the first 12 weeks after start of treatment are equally or even more strongly related to xerostomia at 6 month than at 12 weeks. These associations suggest that, even early after treatment, the CT image feature changes may be used as objective biomarkers of the development of xerostomia.

PD-0530

Predictors of hematological toxicity after whole-pelvis intensity-modulated post-prostatectomy radiotherapy

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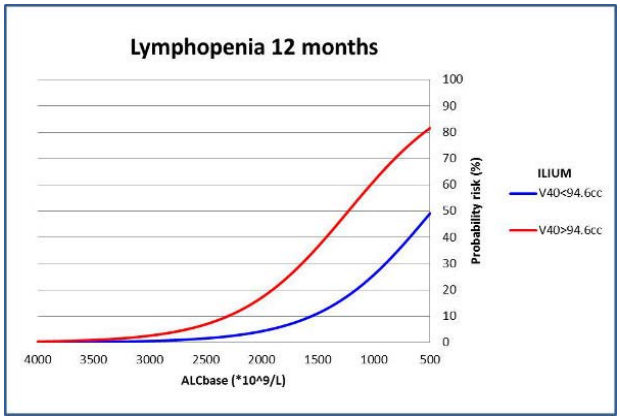
Purpose/Objective: Hematologic toxicity (HT) is an important side-effect of whole pelvis intensity-modulated radiotherapy (WP-IMRT), but association between radiation dose and HT remains unclear when concurrent chemotherapy is not prescribed. The aim of this study was to identify clinical and dosimetric predictors of HT in a cohort of chemo-naÏf patients treated with WPRT.
Materials and Methods: The first 121 patients enrolled in a prospective observational study, treated with adjuvant (n=72) or salvage (n=49) WP-IMRT in a single Institute were available (static field IMRT: 19; VMAT/Rapidarc:57; Helical Tomotherapy:45). Pelvic bones, used as a surrogate for pelvic bone marrow (BM), were contoured according to Mell et al [IJROBP 2006] and divided in four subvolumes: ilium (IL), lumbosacral spine (LS), lower pelvis (LP) and whole pelvis (WP). The volume of each BM region receiving 3, 5, 10, 20, 30, 40 and 50 Gy (V3-50) was recovered. Absolute values of lymphocytes (ALC), white blood cell (WBC) and neutrophils (N) were prospectively collected before WPRT, at half WPRT, at end WPRT, at 3m and at 12 months after WPRT. HT was graded according to CTCAE v. 3.0: Grade 3 (G3) and Grade 1 (G1) events were considered as end-points for acute (nadir value) and late HT respectively. Uni- and backward multi-variable logistic regression was performed to assess correlation between clinical/DVH parameters and HT. A previously introduced method based on DVH differences between patients with/without HT was used to select the most discriminative DVH parameters.
Results: The nadir of WBC and N (median values= 65% and 74% of baseline respectively) was found at half-therapy while it was at the end of RT for ALC (median= 30% of baseline). No patients showed acute G3 neither late G1 WBC and N toxicities. Interestingly, the mean value of ALC at 1 year was 54% of baseline: 28 acute G3 and 14 late G1 lymphopenias were found. Then, the analysis was restricted to ALC at the end of therapy (ALCend) and at 12 months (ALC12m). At univariate analysis, a lower baseline ALC (ALCbase) was correlated with G3 ALCend and G1 ALC12m (p=0.003 and p<0.001, respectively). Concerning dosimetric parameters, IL-V30/IL-V40 and WP-V40 were correlated with acute G3 ALCend and late G1 ALC12m (p=0.003). The resulting model for ALCend included ALCbase and WP-V40 (AUC =0.73); the model for ALC12m included ALCbase and IL-V40 (AUC= 0.82). Best cut-off values (assessed by ROC) discriminating patients with/without lymphopenia were: ALCbase ≤1830 x 10(9)/L and WP-V40 >599.4 cc (G3 ALCend); ALCbase ≤1780 x 10(9)/L and IL-V40>94.6 cc (G1 ALC12m) (Fig-1).



Conclusions: Two-variable models including ALCbase and DVH parameters of pelvic BM may predict acute G3 and late G1 lymphopenia after WP-IMRT in post-prostatectomy RT. The model could be used to reduce HT by constraining BM. Further validation on a larger population is ongoing.

PD-0531

Dosimetric investigation of rotational setup errors for spine stereotactic radiosurgery: a phantom study

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Purpose/Objective: A final accuracy of positioning < 2 mm is the recommended tolerance level for image-guided radiotherapy (IGRT) for spine stereotactic radiosurgery (SRS) in RTOG 0631. However, the tolerance level for rotation is not specified. This study investigated experimentally the effect of rotational setup errors on dose distribution for spine SRS.
Materials and Methods: The contour definitions and treatment planning were as per RTOG 0631. A 16-Gy dose was prescribed in a single fraction by step-and-shoot intensity-modulated radiation therapy (IMRT) using seven coplanar beams with the Vero4DRT (Mitsubishi Heavy Industries, Ltd., Hiroshima, Japan, and Brainlab AG, Feldkirchen, Germany). An isocenter was placed inside the vertebral body. Setup error patterns were categorized into three groups. Only translational errors were generated for Group A, with the translational errors measuring +1, +2, +3, and +5 mm in the lateral (LAT), longitudinal (LNG), and vertical (VRT) directions, respectively. Only rotational errors were generated for Group B, and measured +1°, +2°, +3°, and +5° in terms of the tilt or roll angle. Combinations of translational and rotational errors occurred in Group C. Translational errors of 0 to 2 mm were generated in each direction and rotational errors of ±1° or ±2° in each direction. Data were acquired with a Delta4 phantom (ScandiDos, Uppsala, Sweden) and setup errors were generated with HexaMotion (ScandiDos, Uppsala, Sweden).